Space Weather Forecast

Issued on Sunday, 29 October 2023 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: G1 Minor Storms expected day 1 (29 Oct) with a chance G2 Moderate Storm intervals. Risk decreasing day 2 (30 Oct) onward.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only isolated low level Common Class flares, with the largest from a small sunspot region on the northeast disc. There are four sunspot regions on the disc, all of which are small with little sign of notable growth. No Earth-directed CMEs (coronal mass ejections) have been observed, with the main visible CME off the southeast disc assessed as being from the far-side.

Solar Wind / Geomagnetic Activity: A gradual transition into the fast wind of a large coronal hole has likely been observed. Solar wind speeds were initially background, at 350 km/s, but erratically climbed through the period to reach around 570 km/s by midnight UTC. The total Interplanetary Magnetic Field (IMF), has ranged from Weak to Moderate levels. The north-south component was mostly negative (southward) with some brief periods of moderate strength. Geomagnetic activity was initially Quiet (Kp 1), but then became Unsettled to Active (Kp 3-4) from 28/0300 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Very Low or Low activity is expected, with isolated Common Class flares. There is a slight chance of isolated Moderate flares.

Solar Wind / Geomagnetic Activity: There are no Earth directed CMEs. Current solar wind enhancement is due to an ongoing transition into the large coronal hole fast winds. This is expected to dominate through the period. Solar winds are expected to peak day 1 (29 Oct) at around 600-700km/s, before easing gradually through the rest of period. Unsettled to G1 Minor Storm activity is expected day 1 with a chance of an isolated G2/Moderate storm interval. Activity then easing, to Quiet to Active day 2 (30 Oct), then Quiet to Unsettled with a chance of Active intervals day 3 (31 Oct). Given the expected wind speeds there also remains a chance of isolated G1 Minor Storm intervals day 2, and a slight chance day 3. This activity has the potential to bring some visible aurora to the far north of the UK, across parts of Scotland, as well as other locations at similar latitudes.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at background with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	80	40	20	1
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	10	15	25
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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